AC 2010-1455: A MULTI-FACETED STRATEGIC PLANNING PROCESS FOR INNOVATION

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A Multi-Faceted Strategic Planning Process for Innovation

Strategic planning has become an important component of how academic programs set goals and priorities. We present an approach to strategic planning that is characterized by inclusion of internal and external stakeholders and is unique in the combination of process tools utilized.

1. Introduction
In the five years leading up to the beginning of our current strategic planning cycle, the College of Engineering at Purdue had undergone a period of significant growth both in faculty and facilities. The key questions facing the college centered around how to identify and realize the opportunities that this growth was creating. With this in mind, when the work on the next generation strategic plan began in late 2006, inclusiveness and widespread engagement of stakeholders were defining goals for the planning process. Reflecting this goal of including all levels of faculty and staff as well as students, outside academic and industrial experts and alumni, approximately hundreds of people across 25 continents have been engaged in the preparation of the strategic plan. This inclusiveness of internal and external stakeholders has promoted a rich atmosphere for new ideas and approaches continued when teams were formed to translate strategies to actions.

In an effort to find new sources of value when planning for our learning, discovery, and engagement missions, we sought out tools that would help stimulate new thinking and facilitate thoughtful discussion. Blue Ocean Strategy is based on study of industrial companies over the past century which have found success by providing goods and services valued by customers and other stakeholders that are truly different from their competitors. For our College, this approach focuses on stakeholders and providing value in new ways. Two facilitating tools – Polarity Management and Creative Problem Solving – have been adopted in combination with Blue Ocean Strategy.

In the remainder of the paper, we describe each of the three tools (Blue Ocean Strategy, Polarity Management and Creative Problem Solving) in more detail. Additionally, we describe the process that our College used to combine the tools in an integrated strategic planning process and the approach that our College used to implement this strategic planning process through the careful formation of teams and the support provided to these teams.

2. The Tools: Blue Ocean Strategy, Polarity Management and Creative Problem Solving

Blue Ocean Strategy
A primary goal of the Blue Ocean Strategy is to identify and create uncontested market spaces—industries and offerings that are not yet in existence. While Blue Ocean Strategy is written with an industrial context in mind, the idea of new industries/ uncontested market spaces is still highly relevant to colleges and universities. Rather than offering products for consumers to purchase, colleges and universities offer educational experiences, and/or research opportunities for
students, staff and faculty while also offering newly created knowledge and well prepared students to our external stakeholders. Just as the end goal of creating new offerings can be understood within an academic context, much of the activities and processes associated with the Blue Ocean Strategy are highly relevant: examining the current reality and using a Strategy Canvas to construct an As-Is Value Curve (which identifies value levels to key stakeholders) to portray the current strategic profile, using the Four Actions Framework (Eliminate, Reduce, Raise, and Create) to focus on dimensions which provide stakeholder value, pursuing Six Paths (Look Across: Alternative Industries, Strategic Groups, the Chain of Buyers, Complementary Offerings, Functional or Emotional Appeal, and Time)and constructing a To-Be Value Curve to envision a future strategic profile to consider what new offerings might look.

**Polarity Management**¹

While Blue Ocean Strategy provides a tool for envisioning new opportunities, Polarity Management provides a tool for negotiating the change process. More specifically, Polarity Management recognizes existing tensions—tensions that may exist between goals, ideas or values—and, by explicitly recognizing them, provides an opportunity for reflection and preservation of both halves of the polarity (both goals/ideas/values that are in tension). An example polarity may be time and money—often it is more expensive to accomplish something faster, and more time-consuming to accomplish the task in a less expensive manner. However, by recognizing these as a polarity to manage, rather than a simple either-or trade-off, we can begin to look for ways to meet both goals. For a faculty member, there is often tension in balancing teaching and research. Again, this can be considered as a polarity to manage, which would allow a university to consider ways to value and support both activities, as well as allow a faculty member to develop strategies for balancing and valuing both activities and hopefully finding synergies between the two.

**Creative Problem Solving**

Finally, a Creative Problem Solving approach works in conjunction with the Blue Ocean Strategy and other planning activities, as it supports the team’s ability to step out of the present and envision new opportunities for the College or University. Creative Problem Solving has been studied in many different contexts under many different names. Perhaps most relevant to a College of Engineering is the body of research conducted on the Engineering Design Process⁴. Journals such as *Design Studies* and communities such as the Design Research Society are devoted to characterizing design processes and practices, with major emphases in engineering design, architectural design, and product design. One specific resource for engaging in Creative Problem Solving is *Sticky Wisdom*³, a set of behaviors that help people move from the “analytical world” to the “creative world.” Like the other two tools, Blue Ocean Strategy and Polarity Management, Sticky Wisdom is written for the corporate world, but offers ideas that are also highly relevant for academia. Sticky Wisdom focuses on six types of behaviors: freshness (filling your mind with freshness by seeking a variety of stimuli), greenhousing (protecting new ideas by nurturing them until they are developed enough to critically evaluate), realness (moving your ideas from a concept to something “real” through a prototype), momentum (and dismantling the barriers to momentum), signaling (using verbal, visual and physical signals in communication with others and yourself), and courage (to step out of your comfort zone).³
3. Initial Goal Setting & Team Formation
Prior to the activities described in this paper, foundational work on the College strategic plan had already been completed: over the course of two years, conversations with faculty, staff, alumni, and students both at Purdue and at universities around the world had guided a process of iterative visioning and re-envisioning, ultimately leading to a high-level strategic planning document. Through this earlier process, a vision, mission, core values, goals, and key strategies were established. To begin the process described in this paper, “team co-captains” were selected to lead teams that would take each strategy and move it from a “big idea” to a set of actionable activities. An example of a strategy from the plan is “Educate Renaissance Engineers for the 21st Century World.” Actionable activities under this strategy include “(a) developing and implementing the Purdue Engineer of 2020 curriculum, (b) defining the role of engineering in pre-university education,” and so on. A total of 33 teams, which included approximately 400 people from both within and outside of Purdue, were formed to accomplish this work. The team co-captains, working with the College director of strategic planning and other College leaders, brainstormed potential team members, with the goal of creating teams that broadened the discussion beyond the “usual players,” bringing together new combinations of faculty, staff, students, members of the College’s Engineering Leadership Team, alumni, experts from outside the university, and other stakeholders.

4. Support Provided to the Teams
Each team received support for their endeavors in terms of training, IT support and financial resources. Team captains attended two days of training related to Polarity Management and two days of training that combined Blue Ocean Strategy and Creative Problem Solving. The training sessions were facilitated by external consultants. Additionally, team captains were given copies of the three resource books. Team members were likewise provided training on the same three topics; however, this training was condensed to a single day. As team captains were identified, the College also established an “Internal Resource Team” made up of 18 faculty and staff from across the College. Each Internal Resource Team member received the Team Captains’ training, as well additional training, so that the Internal Resource Team members could serve as in-house resources in the three process tools and their integrated use. Each Internal Resource Team member was assigned to a group of planning teams to serve as a resource on the use of the tools. Finally, members of the Engineering Leadership Team and Engineering Advisory Council also participated in training sessions in order to have familiarity with the tools and to support the integration of the teams’ work. These forms of support—extensive training and Internal Resources that could help facilitate meetings or advise teams—provided an opportunity to use a common framework for representing the teams’ progress, analyses, and recommendations.

5. Thinking Process
As each of the 33 teams met, they engaged in a variety of activities but with similar goals in mind. Each team had a specific commission (e.g. the Student of 2020; Faculty of 2020) that needed to be defined and redefined by the team in order to appropriately bound the team’s task. Each team was instructed to characterize the “current reality” within the College, construct Value Curves (see Figures 1 and 2), and use the Six Paths Framework to consider future opportunities, consistent with the Blue Ocean Strategy. Each team was also instructed to identify polarities to manage that were relevant to their charge (an example of a Polarity Map is presented in Figure 3). In Figure 4, we present a representation of how some teams integrated the three tools (Blue...
Ocean Strategy, Polarity Management, and Creative Problem Solving). This Figure shows how the tools fit together conceptually and logically.

Figure 1: As Is Value Curve from One Team A

Figure 2: To Be Value Curve from Team A
Figure 3: Polarity Map from Team A

Figure 4: A Conceptual Model of the Process of Using Blue Ocean Strategy with Polarity Management and Creative Problem Solving

In Figure 4, the term “problem scoping” is used in the engineering design research literature\(^4\,^5\) (and also exists widely in industry). The process of problem scoping encompasses the activities of defining and redefining what the problem to be solve actually is, as well as gathering information relevant to the task at hand. Problem scoping also involved drawing boundaries and determining what is “in scope” and “out of scope” so that focus and a team consensus can be achieved. The behaviors associated with Creative Problem Solving are used here. Another crucial part of the process is the involvement of stakeholders. This is consistent with Blue Ocean Strategy, as well as engineering design (and more specifically User-Centered Design). Our teams sought stakeholder input through interviews/phone interviews, focus groups, web surveys and email surveys. Some teams were also very deliberate about ensuring that they had included all appropriate stakeholders as team members (consistent with a Participatory Design approach).

In practice, the teams pursued a variety of activities, and some teams’ processes were more
consistent with the process depicted in Figure 4 while other teams’ processes were quite different. In some cases, teams used the tools to justify a proposal they had already identified, rather than using the tools in the process of identifying a proposal.

6. Next Step: Moving from Strategic Planning to Implementation
Our use of Blue Ocean Strategy, with support from Polarity Management and Creative Problem Solving tools, has led to identification of striking new opportunities for our strategic plan. However, Blue Ocean Strategy stops short of implementation or action planning. We are currently in the process of preparing for this next phase and a separate process is required. Discovery Driven Planning (DDP) is a tool that has been developed specifically for circumstances characterized by the high levels of uncertainty which occur when you are innovating.

**Framing**

DDP begins with the end in mind. You begin by conceptually framing the desired outcomes and then putting quantitative dimensions on the Blue Ocean being developed. Framing is identifying the purpose, the desired result/benefit and the required performance of the venture or project under consideration. Framing would also consider information about stakeholders and competitors. The dimensions are typically numeric and can include the size of the Blue Ocean opportunity and the resource requirements, e.g. number of employees, space requirements, annual funding requirements, etc., desired level of output and others.

**Assumptions**

The next step is to categorize how these dimensions are determined prior to implementation. Some of the dimensions can be identified through on-line or “market” research or calculated by combining other dimensions (e.g. ratios), but at this early stage many must be assumed. Just as with Blue Ocean, it is vital to:

1. Identify these assumptions and make them explicit;

2. Categorize these assumptions as internal (governed by how we operate or structure) or external – typically variables dictated by economic conditions; and

3. Estimate our range of uncertainty around each assumption and then test the sensitivity of the Blue Ocean’s attractiveness against the uncertainty of these assumptions.

**Milestone Plan**

The remainder of DDP consists of establishing milestones and a plan for how to reach them. Each milestone tests one or more of the key assumptions. DDP is a learning approach to new ventures or projects so there is a studied re-planning based on the knowledge gain/uncertainty reduction at each milestone. Careful design of the milestone program will permit minimum risk to be taken prior to commencing with final implementation of the Blue Ocean opportunity.
7. Discussion

Our process has been unique in two dimensions. These tools are traditionally applied in industry contexts, not academic environments. Additionally, these three tools have not previously been integrated and applied in academic environments or in any other enterprise. We have begun to see some of the rewards of taking this novel approach to our planning efforts: they provide a focus on stakeholders and the future. This is key as we work to answer the overarching challenge of providing an engineering education in a rapidly changing world. Work to date is encouraging not only in the applicability of the tools to a wide range of focus areas, but in the creativity of unique paths forward that are being identified and validated by their stakeholders. Early indications suggest that the strategic planning process had a positive impact on the ideas generated by the teams. Many teams suggested that the process helped them to realize novel ideas that they might not have otherwise identified. As we are now beginning the implementation phase of the process, we will soon be in a position to be able to systematically collect evidence of the extent to which our process enabled us to implement the novel changes and provide additional value to our diverse stakeholders.

It is also significant to note that broad inclusion of participants who have fluency in the tools is having an immediate effect as these same people are beginning to look at their research, teaching and administrative responsibilities through the lenses provided by these tools. Faculty members have reported that these tools have benefited their research enterprise. Additionally, the tools have provided a new vocabulary that has been adopted by much of the College as a common reference point. For example, in some departments faculty and staff have begun to identify various challenges that they encounter as “polarities to manage,” or as “blue oceans” that can be explored.

We believe that the process we have used also has implications for education. For example, previous research suggests that students tend to spend very little effort on problem scoping activities. Some of the activities used in the College’s process to engage in problem scoping could likewise be used by students to engage in problem scoping activities, with the idea that increased opportunities to practice a skill will help students adopt the skill. Similarly, our College has engaged in teaching students User-Centered Design skills. Our team’s experiences could serve as example for students as they learn User-Centered Design.

For entrepreneurship education, our experiences suggest that the tools (Blue Ocean Strategy, Polarity Management, Creative Thinking and Discovery-Driven Planning) that we used for our strategic planning process would be valuable for students to learn as well. Our experiences also suggest that it would be valuable for students to recognize how the different tools can fit together, and for students to develop the thinking skills that would allow them to evaluate and combine other similar tools in order to engage in and facilitate innovative thinking. Our process can benefit not only other colleges, universities or organizations engaged in strategic planning or innovation, but can also inform efforts to educate students.

References


